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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/697,708 | 10/25/2000 | Ulf Ahlfors | 6563-54185 | 4828 |

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PILLSBURY WINTHROP SHAW PITTMAN LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER

HAN, CLEMENCE S

ART UNIT PAPER NUMBER

2665

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/697,708

Applicant(s)

AHLFORS ET AL

Examiner

Clemence Han

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19,20,43 and 44 is/are allowed.
- 6) ☒ Claim(s) 1-18,21,22,24-42,45,46 and 48 is/are rejected.
- 7) ☒ Claim(s) 23 and 47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claim 1-7, 22, 24-31, 46 and 48 are rejected under 35 U.S.C. 102(a) as being anticipated by Iliadis (US 5,995,486).

Regarding to claim 1 and 25, Iliadis teaches a method for controlling a switch comprising: a number of input ports, each receiving data cells on a respective link (Column 8 Line 27-33); a number of output ports sharing a buffer space in which each output port can reserve space for an output queue (Column 8 Line 61-65), wherein incoming data cells are switched to an appropriate output queue (Column 8 Line 66-67); a flow control means for pausing and un-pausing senders on selected links (Figure 3); the method including the steps of: monitoring the remaining available buffer space AS of the shared buffer (Iliadis teaches monitoring the occupied buffer space N, which is the compliment of AS. Total buffer space = available buffer space AS + occupied buffer space N., Column 5 Line 43-49); estimating the expected total content LE of the links (Q in Column 7

Line 7-10); calculating a free margin (FM) as the remaining available buffer space minus the expected total content of the links $FM=AS-LE$ (Iliadis teaches calculating the expected occupation V , which is the compliment of FM. Total buffer space = free margin FM + expected occupation V .

$$FM=AS - LE$$

$$\text{Total buffer space} - V = \text{Total buffer space} - N - Q$$

$$- V = - N - Q$$

$$V = N + Q \text{ (equation 8 in Column 6 Line 34));}$$

if the free margin sinks below a threshold $AS-LE < A$, then a selected link is paused (Column 6 Line 13-18, Column 8 Line 11-15); if the free margin thereafter raises above a threshold $AS-LE > B$, then a selected paused link is un-paused (Column 8 Line 20-25).

Regarding to claim 2 and 26, Iliadis teaches flow control means comprising a pause frame generator for generating pause frames to be sent to data senders in order to pause senders on a selected link, and generating un-pause frames to be sent to data senders in order to un-pause senders on a selected paused link (Figure 2 and 3, Column 5 Line 1-7).

Regarding to claim 3 and 27, Iliadis teaches the content LE of the links estimated as the sum of the contents of all the input links (Column 7 Line 7-10).

Regarding to claim 4 and 28, Iliadis teaches the estimation of the content LE of the links takes into account the different link lengths and bit rates (Column 7 Line 10).

Regarding to claim 5-7 and 29-31, Iliadis teaches sending a pause frame to inhibit transmission from an input link (Figure 3, Column 6 Line 13-18, Column 8 Line 11-15). The response latency to the generated pause frame is inherent due to the propagation delay and is well known in the art.

Regarding to claim 22 and 46, Iliadis teaches the threshold A is set to zero (equation 7 in Column 6 Line 18, the stop signal is generated when $V=B$, in other word when $B - V = FM = 0$).

Regarding to claim 24 and 48, Iliadis teaches the threshold A is less than or equal to the threshold B (Iliadis teaches setting A to zero, see the rejection of claim 22. Iliadis also teaches sending start signal when V falls below a threshold, see Column 8 Line 20-25. Due to the their complimentary nature, when V falls below a threshold, FM raise above a threshold. In the case of the equation 12 in Column 8, B is 1 which is greater than or equal to the threshold A.).

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claim 8-18, 21, 32-42 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iliadis in view of Ren et al. (US Patent 6,456,590).

Regarding to claim 8 and 32, Iliadis teaches the maximum amount of data is related to the propagation delay (Column 7 Line 10). Iliadis, however, does not teach the maximum amount of data equals twice as much as a round trip content plus two full-sized packets. Ren teaches the maximum amount of data equals twice as much as a round trip content plus two full-sized packets (Column 10 Line 40-41). It would have been obvious to one skilled in the art to use in Iliadis twice as much as a round trip content plus two full-sized packets as taught by Ren in order to consider the response latency to avoid overflow.

Regarding to claim 9 and 33, Ren teaches the minimum amount of data equals one full-sized packet (Column 10 Line 34).

Regarding to claim 10 and 34, Ren teaches the slopes of the linear increase and decrease depend on the bit rate of the respective link (Column 10 Line 41).

Regarding to claim 11 and 35, Ren teaches the most offending sender is paused first (Column 11 Line 25-28).

Regarding to claim 12 and 36, Ren teaches the least offending sender is un-paused first (Column 11 Line 36-38).

Regarding to claim 13 and 37, Ren teaches detecting offending senders by means of an overflow sum counter OFS 80.

Regarding to claim 14 and 38, Ren teaches a counter OFS associated with each input port, (Column 8 Line 37-39) and increased each time the input port sends a packet to a congested output port (Column 7 Line 57-64).

Regarding to claim 15 and 39, Ren teaches the counter OFS of each input port is increased with the packet length (Column 8 Line 40-41).

Regarding to claim 16 and 40, Ren teaches the counter OFS is reset to zero when its associated input port receives an un-pause frame (Column 10 Line 10).

Regarding to claim 17 and 41, Iliadis teaches an output port is considered congested if the queue length thereof exceeds a threshold (Column 6 Line 13-18, Column 8 Line 11-15).

Regarding to claim 18 and 42, Iliadis teaches a method for controlling a switch comprising: a number of input ports, each receiving data cells on a respective link (Column 8 Line 27-33); a number of output ports sharing a buffer space in which each output port can reserve space for an output queue (Column 8 Line 61-65), wherein incoming data cells are switched to an appropriate output queue (Column 8 Line 66-67); a flow control means for pausing and un-pausing senders on selected links (Figure 3); the method including the steps of: monitoring

the remaining available buffer space AS of the shared buffer (Iliadis teaches monitoring the occupied buffer space N, which is the compliment of AS. Total buffer space = available buffer space AS + occupied buffer space N., Column 5 Line 43-49); estimating the expected total content LE of the links (Q in Column 7 Line 7-10); calculating a free margin (FM) as the remaining available buffer space minus the expected total content of the links $FM=AS-LE$ (Iliadis teaches calculating the expected occupation V, which is the compliment of FM. Total buffer space = free margin FM + expected occupation V.

$$FM=AS - LE$$

$$\text{Total buffer space} - V = \text{Total buffer space} - N - Q$$

$$- V = - N - Q$$

$$V = N + Q \text{ (equation 8 in Column 6 Line 34));}$$

if the free margin sinks below a threshold $AS-LE < A$, then a selected link is paused (Column 6 Line 13-18, Column 8 Line 11-15); if the free margin thereafter raises above a threshold $AS-LE > B$, then a selected paused link is un-paused (Column 8 Line 20-25). Iliadis teaches flow control means comprising a pause frame generator for generating pause frames to be sent to data senders in order to pause senders on a selected link, and generating un-pause frames to be sent to data senders in order to un-pause senders on a selected paused link (Figure 2 and 3,

Column 5 Line 1-7). Iliadis teaches an output port is considered congested if the queue length thereof exceeds a threshold (Column 6 Line 13-18, Column 8 Line 11-15). Iliadis, however, does not teach the most offending sender paused first, detecting offending senders by means of an overflow sum counter OFS, a counter OFS associated with each input port, and increased each time the input port sends a packet to a congested output port, the queue length threshold equals a maximum length packet. Ren teaches the most offending sender is paused first (Column 11 Line 25-28), detecting offending senders by means of an overflow sum counter OFS 80, a counter OFS associated with each input port, (Column 8 Line 37-39) and increased each time the input port sends a packet to a congested output port (Column 7 Line 57-64), the queue length threshold equals a maximum length packet (Column 13 Line 61-62). It would have been obvious to one skilled in the art to modify Iliadis to pause most offending sender as taught by Ren in order to ensure no buffer overflow (Column 11 Line 25).

Regarding to claim 21 and 45, Ren teaches all the OFS counters are decreased linearly with time (Column 8 Line 41-43).

Allowable Subject Matter

5. Claim 23 and 47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claim 19 and 43 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art of the record, cited herein, fails to disclose when one counter reaches this maximum, all counters are divided by 2.

7. Claim 20 and 44 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Prior art of the record, cited herein, fails to disclose when one counter reaches this maximum, the value of the smallest counter is subtracted from all the counters.

Response to Arguments

8. Applicant's arguments with respect to claim 1-48 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clemence Han whose telephone number is

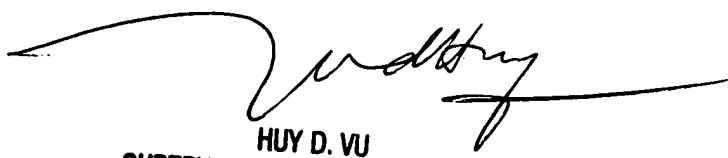
(571) 272-3158. The examiner can normally be reached on Monday-Thursday 7 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.H.

Clemence Han
Examiner
Art Unit 2665



HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600